



CON 244
Construction Contracting
Lesson 5
Student Guide

May 2016

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Lesson 5 – Construction Contract Administration, Compliance

Overview



Introduction The Federal Acquisition Regulation (FAR), Part 36, Construction and Architect-Engineer Contracts provides special clauses that pertain specifically to the unique characteristics encountered in construction. The remaining lessons will specifically focus on these construction clauses and their requirements. In this lesson, the basic knowledge of construction clauses used in determining construction contract work compliance will be discussed.


Questions to ponder:

Why does the Government Care about Construction Contractor Compliance?

Where do we find & what are the Specific Clauses that apply to Construction?

How do we apply these clauses in the administration of our Construction Contracts?

Lesson Details

	Terminal Learning Objective
Given a construction contract, determine the applicable construction contract administration (compliance) approach, using FAR, DFARS, DOD regulation/guidelines, and best business practices.	

Lesson Title Construction Contract Administration, Compliance

Terminal Learning Objective Given a construction contract, determine the applicable construction contract administration (compliance) approach, using FAR, DFARS, DOD regulation/guidelines, and best business practices.

Enabling Learning Objectives

- Analyze the required contract administration compliance for the various applicable construction clauses.
- Explain the Government responsibilities in construction quality assurance.
- Explain the contractor responsibilities in construction quality assurance.
- Discuss the essential elements of Quality Assurance and Three Phases of Quality Control.
- Analyze the critical elements of a Quality Control Plan.
- Identify the requirements and team members for a pre-construction conference
- Discuss applicable labor laws affecting construction contracting.
- Generalize the requirements for formal partnering.

Time Required 6 hours

Method of Instruction Lecture, plus two Exercises

Student Preparation Prior to Class Read Student textbook-Lesson 5- Construction Contract Administration, Compliance
Scan FAR Part 36 to 36.5, 22.403, 22.404, DFARS 236 thru 236.5, 222.4.

Evaluation Method Student performance will be assessed on course exam and Capstone Case Study.

Lesson 5 – Contract Administration - Compliance

DAU	Question
<p><i>Why does the Government Care about Construction Contractor Compliance?</i></p>	
<p><i>Where do we find & what are the Specific Clauses that apply to Construction?</i></p>	
<p><i>How do we apply these clauses in the administration of our Construction Contracts?</i></p>	

Why does the Government Care about Construction Contractor Compliance?

The answer here is that the facility will be in place a long time (as much as a 100 years), costs a lot of money (most of which is in the operations and maintenance phases), and must be built right the first time. A fundamental difference between construction contracting and other forms is that the facility never gets past milestone A. The prototype is the final and

must be right.


Where do we find & what are the Specific Clauses that apply to Construction?

FAR 52.236-X and DFARS 252.236-X, Uniform Facilities Guide Specifications (UFGS) and Uniform Facilities Criteria (UFC)

How do we apply these clauses in the administration of our Construction Contracts?

Each of the clauses is tied to a Uniform Facility Guide Specification and together forms the rule book for administering the contract. Contract specialists must be familiar with the FAR/DFARS clauses and resultant UFGS sections – particularly those of Division 01 that control the schedule, quality management, construction work site safety and environmental protection controls.

Monitoring Contractor Performance

 **Monitoring Contractor Performance**


- What is the Government interested in?
 - Delivery of supplies or services
 - Avoidance of waste of time and/or money
 - Timely Performance
 - Quality
 - Performance within the budget
- Monitoring contractor performance increases the likelihood that these will be met

Monitoring Contractor Performance:

What is the Government interested in?


First, there is a DoD requirement that led to the need for a facility to be constructed altered or repaired. Consequently there is some measure of urgency to the delivery of supplies or services.

Funding is always a concern and funding for facilities is controlled by Congress. DoD Agencies are mandated to manage the funding in accordance with 40 USC 12. (see GAO Redbook Volume III Chapter 13). Contracting personnel have a fiduciary responsibility to ensure projects are awarded and completed with minimum of waste in both time and money

 **Example Photographs**

- So what is wrong with this picture?


Since there is an operational need, Timely Performance is important. However these facilities are expected to be in place for a long time – the average age of a DoD facility is currently 67 years. Consequently insisting on Quality now ensures long term efficient performance for the future

 **Determine What Needs to Be Monitored**

- Technical Performance
- Schedule Performance
- Cost Performance (cost reimbursement contracts)
- Financial Condition
- Statutory and Regulatory Compliance

What needs to be monitored?

Each project is unique and has technical, schedule, cost and specific statutory or regulatory compliance requirements that must be managed by the acquisition team.




Factors in Monitoring Level

- Place of performance
- Level of contractor's own inspection system
- Criticality of the requirement
- Contract's performance schedule
- Contractor's history on contract performance
- Contractor's financial capability
- Contract type (fixed-price vice cost)
- Contract price

Some of the factors will vary based on the place of performance. Monitoring systems used in Guantanamo Bay Cuba will be different from those used in the mid-western states.

Contract methodology (Design-Bid-Build, Design- Build, ECI) Contract Type (FFP, FPIF, CPFF etc) and the contractor's past performance may also affect the amount of monitoring required.

Trust but Verify.



Examples of Performance Problems

- Schedule: Failure to deliver or make progress toward timely delivery or performance
- Cost: The contractor is exceeding cost estimates on a cost type contract or so far over budget on a fixed-price contract as to endanger schedule and performance.
- Quality: The supplies, services, or work (construction) do not meet contract requirements or not expected to do so.
- Other: Violations of safety, labor laws, environmental laws, subcontracting goals, drugs, etc.

Schedule: Failure to deliver or make progress toward timely delivery or performance

Cost: The contractor is exceeding cost estimates on a cost type contract or so far over budget on a fixed-price contract as to endanger schedule and performance.

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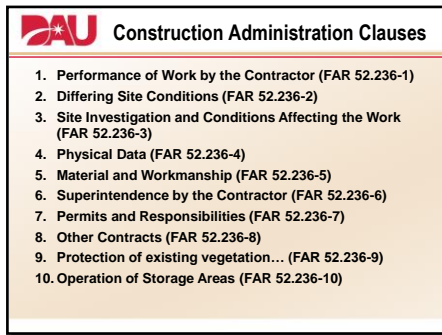
Other: Violations of safety, labor laws, environmental laws, subcontracting goals, drugs, etc.

Construction Clauses



The special construction contract clauses are found in FAR Part

36. Most of the clauses are required above the Simplified Acquisition dollar threshold. The below listing provides a brief synopsis of some of these clauses.



FAR 52.236-1, Performance of Work by the Contractor

FAR 52.236-2, Differing Site Conditions

FAR 52.236-3, Site Investigation and Conditions Affecting the Work

FAR 52.236-4, Physical Data

FAR 52.236-5, Material and Workmanship

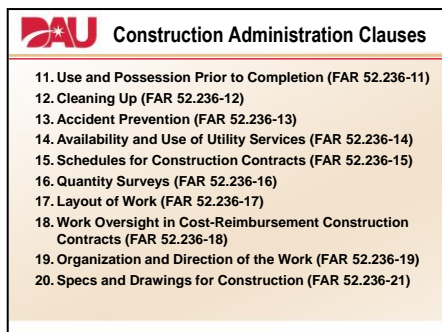
FAR 52.236-6, Superintendence by the Contractor

FAR 52.236-7, Permits and Responsibilities

FAR 52.236-8, Other Contracts

FAR 52.236-9, Protection of existing vegetation, structures, equipment, utilities, and improvements

FAR 52.236-10, Operation and Storage Areas



FAR 52.236-11, Use and Possession Prior to Completion

FAR 52.236-12, Cleaning Up

FAR 52.236-13, Accident Prevention

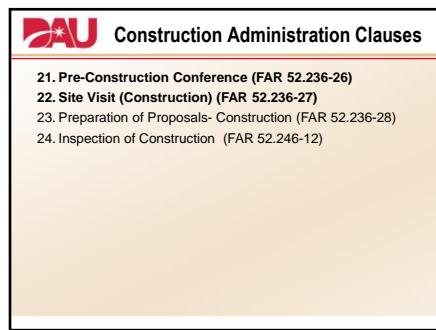
FAR 52.236-14, Availability and Use of Utility Services

FAR 52.236-15, Schedules for Construction Contracts

FAR 52.236-16, Quantity Surveys
FAR 52.236-17, Layout of Work

FAR 52.236-18, Work Oversight in Cost-Reimbursement Construction
Contracts

FAR 52.236-19, Organization and Direction of the Work



FAR 52.236-21, Specifications and Drawings for
Construction

FAR 52.236-26, Pre-construction Conference

FAR 52.236-27, Site visit

FAR 52.236-28, Preparation of Offers-Construction

FAR 52.246-12, Inspection of Construction

Pre-Construction Conference



The postaward orientation or preconstruction conference is commonly referred to as a PRECON.

In accordance with FAR clause 52.236-26, Preconstruction Conference, if the Contracting Officer decides to conduct a conference, the successful offeror will be notified and will be required to attend.



The notification should include date, time, locations, any need for attendance of subcontractors, and an agenda.



Who should attend?

For the Government:

Contracting Officer, Contract Specialist, COR(s), Project Manager, Engineer(s), Fire chief, Security, Safety, Customer/End User, Architect-Engineer,

For the Contractor

Officer of the company with authority,
Project superintendent,
Individual responsible for documentation,
Safety representative,
Quality Control superintendent,
Major subcontractor representatives

Potential PRECON Topics...		
Safety		LDs
Correspondence		Fire & Security
Labor	Storage	Schedules
	Submittals	HazMat
Roles and Responsibilities		Invoices
Permits	Utilities	Value Engineering
	Insurance	Testing

Topics for Discussion

In accordance with FAR 36.212, Preconstruction Orientation, the contracting officer will inform the successful offeror of significant matters of interest, including:

Statutory matters (i.e., labor standards and subcontracting plan requirements); and
Other matters of significant interest, including who has

authority to decide matters including contractual, administrative, and construction responsibilities and any contractor agenda items.

In accordance with DFARS 222.406 the Contracting Officer shall promptly notify the prime and any designated subcontractors of the labor standards requirements of the contract.

It is a decision of the Contracting Officer whether a preconstruction conference is held or, as a minimum, a written document should be sent to the contractor explaining the above items.

Submittals	
<ul style="list-style-type: none"> • Post award submittals <ul style="list-style-type: none"> – Bonds – Insurance • Pre-construction submittals <ul style="list-style-type: none"> – Baseline Schedule- as required – Quality Control Plan <ul style="list-style-type: none"> • QC manager Qualifications – Construction Safety Plan <ul style="list-style-type: none"> • Fall Protection Plan • Lock out / Tag Out – Environmental Protection Plan 	<p>Before Notice to Proceed (NTP) issued and Pre-Con held</p> <p>Before Notice to Proceed (NTP) can be issued</p>

Notice of Award vs. Notice to Proceed

There are certain specific actions that must be completed before the contract award can be completed. Notably approval and incorporation of required subcontracting plan.

FAR 36.213-4 requires that a Notice of Award be given and “specify the date of commencement of work, or advise that a notice to proceed will be issued.” FAR 1.602 mandates that Contracting Offices ensure that no contract “shall be entered into unless the contracting officer ensures that all requirements of law, executive orders, regulations, and all other applicable procedures, including clearances and approvals, have been met.”

However, even after the contract has been awarded, the contractor may be prohibited from starting. The Notice to Proceed is unique to the construction contract field and is tied to the requirement that all legal concerns must be addressed as follows:

BONDS: In accordance with FAR 28.102-1(a), 100% performance and payment bonds are required for any construction contract exceeding \$150,000. Paragraph (c) of this subsection states that the contractor shall furnish all bonds before receiving a notice to proceed or being allowed to start work.

INSURANCE: The Contractor shall submit to the Contracting Officer, prior to commencement of work, evidence that the Contractor has current General Liability and Automobile Liability Insurance, as well as Workmen's Compensation or Employer's Liability Insurance, as required by the contract. In addition, unless the Contractor's insurance coverage specifically includes all Subcontractors, each Subcontractor (all tiers) performing work on the jobsite must submit evidence of insurance coverage to the Prime Contractor in the amounts required by the contract.

OTHER REQUIRED SUBMITTALS: NTP is withheld until plans that address quality management; worker and site safety practices; and environmental laws have been considered and all area properly addresses. In accordance with FAR 52-236-15, at the Contracting Officer's discretion they can also require a scheduled submittal before or after NTP.



Statutory PRECON Requirements

Per FAR 36.212 whether or not a formal meeting is held:

- Contract labor standard requirements shall be discussed IAW with DFARS 222.406-1
 - (1) Construction Wage Rate Requirements statute;
 - (2) Contract Work Hours and Safety Standards statute;
 - (3) Copeland (Anti-Kickback) Act;
 - (4) Parts 3 and 5 of the Secretary of Labor's Regulations (Parts 3 and 5, Subtitle A, Title 29, CFR); and
 - (5) Executive Order 11246 (Equal Employment Opportunity)
- Subcontracting plan requirements IAW with subpart FAR 19.7

PRECON Statutory Requirements: Regardless of the forum per FAR 36.212, it is a statutory requirement that:

A. Contract labor standard requirements shall be discussed – Including:

- (1) Construction Wage Rate Requirements statute;
- (2) Contract Work Hours and Safety Standards statute;

- (3) Copeland (Anti-Kickback) Act;
- (4) Parts 3 and 5 of the Secretary of Labor's Regulations (Parts 3 and 5, Subtitle A, Title 29, CFR); and
- (5) Executive Order 11246 (Equal Employment Opportunity)

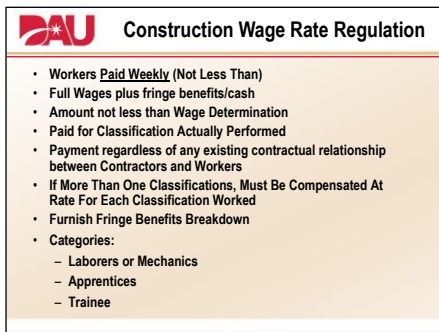
B. Subcontracting plan requirements shall be reviewed and their submittal requirements as stated in FAR subpart 19.7.

Labor Law Issues



This section of the construction contract compliance lesson will examine the contract labor compliance requirements for the Construction Wage Rate Requirements (formerly called Davis Bacon Act).

Construction Wage Rate compliance begins after the commencement of construction contract performance.



Before administering Construction Wage Rate Requirements, it is necessary to thoroughly understand the definition of the terms that are used within the statute. It is important to distinguish the types of workers when reviewing payrolls for compliance, as well as knowing what questions to ask at the time that interviews. The clause that governs the contractor is FAR 52.222-8 and further information on the government's responsibility is at FAR 22.406.

Construction Wage Rate Requirements

All laborers and mechanics employed or working at the work site will be paid under the following rules:

- Unconditional, and not less often than once a week;
- Must be the full amount of wages and fringe benefits or cash; At not less than the amounts cited in the wage determination. Payment must be made regardless of any existing contractual relationship between the contractor and the workers.
- Workers shall be paid for the classification of work actually being performed, regardless of skill.
- Those workers performing on more than one classification must be compensated at the rate for each classification.
- Fringe benefits breakdown shall be furnished.

FAR 22.401:

Laborers or mechanics: "Workers, utilized by the contractor at any tier, whose duties are manual or physical in nature, including those who use tools or who are performing the work of a trade." **Apprentice:** "A person employed and registered in a bonafide apprenticeship program with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or one who has been approved as an apprentice on probation.

Trainee: "A person registered and receiving on-the-job-training in a construction

occupation under an approval from U.S. Dept. of Labor.”

NOTICE TO ALL EMPLOYEES		<small>Obtained from OSHA website</small>
Working on Federal or Federally Financed Construction Projects		
MINIMUM WAGES	You must be paid not less than the wage rate in the schedule posted with this Notice for the kind of work you perform.	
OVERTIME	You must be paid not less than one and one-half times your basic rate of pay for all hours worked over 40 a week. There are some exceptions.	

FAR 22.406-7 requires contracting personnel to assure Construction Wage Rate Requirements (formerly called Davis Bacon Act) provisions are being followed by:

Checking the work site to determine if the contractor has met all of the labor posting requirements.
Reviewing weekly payrolls submitted by the prime and subcontractors.


Conducting interviews

Reviewing daily inspection reports

APPRENTICES	Apprentice rates apply only to apprentices properly registered under approved Federal or State apprenticeship programs.
PROPER PAY	If you do not receive proper pay, contact the Contracting Officer listed below: <div style="border: 1px solid black; padding: 2px; text-align: center; color: red;">YOUR NAME HERE</div> or you may contact the nearest office of the Wage and Hour Division, U.S. Department of Labor. The Wage and Hour Division has offices in several hundred communities throughout the country. They are listed in the U.S. Government section of most telephone directories under: U.S. Department of Labor Employment Standards Administration

Posting

The contractor is required to keep a copy of the wage determination posted at the work site in a prominent place. The Contracting Officer must also furnish to the contractor a poster issued by the Department of Labor, Form WH-1321, Notice to Employees Working on Federal and Federally Financed Construction Projects. This poster informs all workers the necessary procedures in registering a complaint.

	Pay Roll Requirements
<ul style="list-style-type: none"> • Required to Submit Payrolls Within 7 Calendar Days After Payment Date for Both Prime and All Subcontractors <ul style="list-style-type: none"> – Weekly Payrolls – Weekly Statement of Compliance <ul style="list-style-type: none"> • DOL Form WH-347 or Similar Form • Documentation on All Apprentices & Trainees • Apprentice to Journeyman Ratio (FAR 52.222-9) 	

Payroll Reviews

In accordance with FAR 22.406-6, the construction contractor is required to submit, within 7 calendar days after the regular payment date of the payroll week covered, for the contractor and each subcontractor, copies of weekly payrolls applicable to the contract and weekly statements of compliance for both the prime and all subcontractors. Contractors may utilize the

Department of Labor Form WH-347 or a similar form that provides the same data and identical representations.

Minimum payroll information required for each employee is:

- Name, address and employee social security number (initial submission, address and SSN, then last four digits on weekly payroll only.)
- The employee’s classification(s)
- Gross amount earned, hourly rate (including fringe benefits) Number of

- daily and weekly total of hours worked
- Overtime (if any)
- Deductions made (by amount and purpose) Total deductions and actual net wages paid.

DAU	Payroll Reviews
<ul style="list-style-type: none"> • Name, Address, SSN • Labor Classification • Gross Pay, Hourly Rate (Including Fringes - Itemized on Statement of Compliance) • Daily and Weekly Hours Worked • Overtime • Deductions Made • Total Deductions and Net Pay 	

Prior to, or in conjunction with the first report, the contractor must submit documentation on all apprentices and trainees employed, citing the apprentice to journeyman ratio, which then must be compared to the prevailing wage rate restrictions.

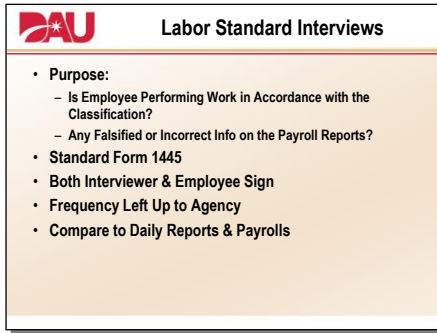
DAU	Statement & Acknowledgement
<ul style="list-style-type: none"> • SF 1413 Submitted Within 14 Days of Award of Each Subcontract • Requires Signed and Dated Acknowledgement that Labor Clauses Were Included In the Subcontract 	

In accordance with FAR Clause 52.222-11, the contractor and any tier subcontractor are required to submit a fully executed Standard Form 1413, Statement and Acknowledgement, within 14 days of award of each subcontract. This form requires the subcontractor's signed and dated acknowledgement that the labor standards cited in paragraph (a) of the clause have been included in the contract.

DAU	Payroll Discrepancies
<ul style="list-style-type: none"> • Contracting Officer MUST be Notified • Notify Prime Contractor In Writing • Original Payroll Submissions should NOT be Returned • Prime Should Submit Revised Payroll with Any Necessary Documentation 	

If, after the Government conducts a payroll review, the payroll contains discrepancies, contracting personnel must notify the Contracting Officer. The Contracting Officer should notify the prime contractor immediately in writing. The prime contractor then must reply to the Contracting Officer, also in writing, by submitting a revised payroll.

Original payroll submissions should never be returned to the prime contractor for corrections, since all payroll documentation becomes a permanent part of the contract file in support of the Construction Wage Rate Requirements compliance.

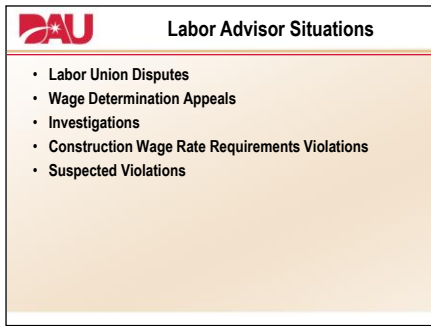


Interviews

Purpose of conducting interviews is (FAR 22.406-7):

- (1) To determine whether each employee is, or is not, performing work consistent with the pay rate classification, and
- (2) To determine any incorrect payrolls.

The frequency of conducting interviews is left up to agency policy. The questions usually asked of the employee are of a general nature; what tasks are being performed on the job, tools used, etc. The interviewer must complete Standard Form 1445 that must be signed by both the interviewer and the employee. After conducting the interview, contracting personnel should then compare the information with submitted payrolls and daily reports for consistency. If any discrepancies are discovered in this review, the same procedures for payroll discrepancies are followed. The Contracting Officer must, by letter, inform the prime and then the prime must reply in writing.



Labor Advisor

After all methods of assuring Construction Wage Rate Requirements compliance have been conducted and there are still unresolved labor issues, these issues must be reported to the Contracting Officer who then will contact the cognizant Labor Advisor before initiating any action.

Other instances when contracting personnel may consider contacting the Labor Advisor:

Labor union disputes, walkouts

Wage Determination Appeals

Investigations (Guidance is found in DFARS 22.406-8) CWRR labor violations

Suspected violations on any labor issue

If a contractor employee approaches any contracting personnel with a labor complaint, such as, the employee says they are not getting paid the amount cited on the payroll, the following procedures must be followed:

- 1) Contractor employee allegations should be to the Contracting Officer
- 2) The Contracting Officer refers the allegations to the Labor Advisor.

- 3) The Contracting Officer or his designee notifies the contractor employee of the referral.
- 4) The contractor in question must not be advised in any manner, or for any reason, of the employee's name, the nature of the allegation, or the fact that the allegation was received.

Website for Labor Advisor: <http://www.dol.gov/whd/america2.htm>

Exercise – Payroll Review

Reviewing the Payroll for Construction Wage Rate Requirements Compliance

Method: Group Exercise

Instruction: Students will break into groups and appoint a spokesperson.

The contract which was issued to Ace Construction Co. for the Repair and Alterations of Building 560 is now underway and you are reviewing the first submission of a subcontractor payroll. Building 560 is three stories and houses students who will be attending contracting classes.

Students are to identify labor compliance deficiencies in the payrolls and documents which are submitted and make recommendations for corrective actions. Use the analysis sheet to document the findings.

Group findings and solutions will be represented by the spokesperson.

The following documents form a part of this exercise:

- (a) Statement and Acknowledgment (SF1413)
 - (b) Initial Payroll Submission
 - (c) Labor Standards Interview documents
 - (d) Daily Reports to Inspector
 - (e) Wage Determination CA 90-2. Note: This project is located in Ventura County.
- Following the exercise the instructor will allow for questions and answers if

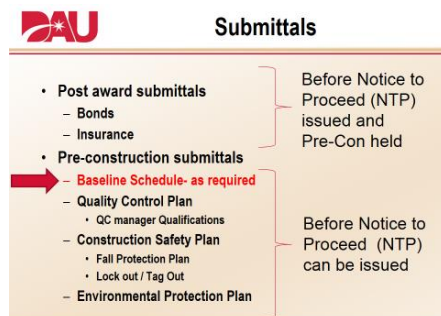
Case Study Information is found on Blackboard or as individual hand out material

Submittals- Construction Schedule




Schedules for Construction Contracts Clause (FAR 52.236-15)

(a) *The Contractor shall, within five days after the work commences on the contract or another period of time determined by the Contracting Officer, prepare and submit to the Contracting Officer for approval three copies of a practicable schedule showing the order in which the Contractor proposes to perform the work, and the dates on which the Contractor contemplates starting and completing the several salient features of the work (including acquiring materials, plant, and equipment). The schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period. If the Contractor fails to submit a schedule within the time prescribed, the Contracting Officer may withhold approval of progress payments until the Contractor submits the required schedule.*



- (b) *The Contractor shall enter the actual progress on the chart as directed by the Contracting Officer, and upon doing so shall immediately deliver three copies of the annotated schedule to the Contracting Officer. If, in the opinion of the Contracting Officer, the Contractor falls behind the approved schedule, the Contractor shall take steps necessary to improve its progress, including those that may be required by the Contracting Officer, without additional cost to the Government. In this circumstance, the Contracting Officer may require the Contractor to increase the number of shifts, overtime operations, days of work, and/or the amount of construction plant, and to submit for approval any supplementary schedule or schedules in chart form as the Contracting Officer deems necessary to demonstrate how the approved rate of progress will be regained.*
- (c) *Failure of the Contractor to comply with the requirements of the Contracting Officer under this clause shall be grounds for a determination by the Contracting Officer that the Contractor is not prosecuting the work with sufficient diligence to ensure completion within the time specified in the contract. Upon making this determination, the Contracting Officer may terminate the Contractor's right to proceed with the work, or any separable part of it, in accordance with the default terms of this contract.*


Schedules

- **Policy:** Fixed price contract, over SAT, with a 60-day or more duration
 - Within a time period required by KO, the
 - KTR must submit a practicable schedule for approval to the KO
 - Reasonable = length of tasks
 - Feasible = Order of tasks
 - Obtainable = Total duration
- Dates for starting and completing salient features of work (acquiring materials, plant and equipment)
- Progress chart of suitable scale to:
 - Indicate % of work scheduled for completion
 - By any given date during the contract

Introduction

Construction contracts typically incur delays for a variety of reasons.


For this situation, it is imperative that the contractor's progress be measured throughout the duration of the contract. This clause requires the contractor to submit a construction schedule so that this measurement can be made.

Policy: This clause states that the contractor must submit a “practicable” schedule. The schedule must be:

Reasonable: Look at the length of each task.

Feasible: Look at the order of the tasks.


Obtainable: Look at the overall project


Schedules

- **Purpose**
 - Provides GOV with tool to measure progress
 - Remedies available if KTR falls behind schedule
 - See Chapter 6 for remedies
- Case Law supports that the approved schedule becomes part of the written record
- Question: What if a contractor submits a schedule with early completion?

Purpose

This clause provides the government with a tool to measure the progress of the contractor throughout the duration of the contract, acts as a basis for analysis of delays, and provides the government with a remedy in the event the contractor falls behind schedule. This clause will be discussed in more detail later in this lesson during the discussion of delay analysis


Schedules Continued...

- **Two Types –**
 - Bar Chart UFGS 01 32 01.00
 - Critical Path Method (CPM) or Network Analysis Schedule NAS) UFGS 01 32 17.00
- **Factors to Consider**
 - Complexity of Project
 - Criticality of Completion
 - Coordination with Other Contracts
 - Contractor's Expertise
 - Cost Benefit Ratio of Requiring Detailed Schedule

Schedule Types

When conducting progress and delay analysis, contracting personnel will rely on the contractor's construction schedule. Most construction projects will use either a bar chart schedule or a critical path method (CPM) chart; the contract specifications may indicate which type of schedule the contractor is to use.

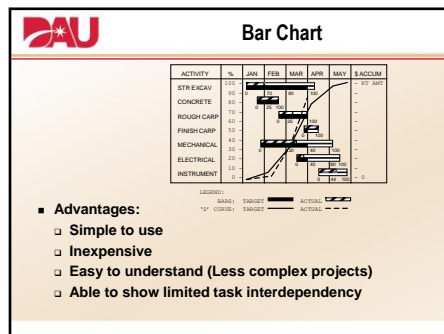
Schedules are specified in UFGS Division 01. There are several specifications which may be included in the contract UFGS 01 32 01.00, UFGS 01 32 16.00 20, or UFGS 01 32 17.00 20 Network Analysis Schedules (NAS).¹

UFGS 01 32 01.00 Paragraph 3.1

“Prepare for approval a Project Schedule, as specified herein, pursuant to the Contract Clause, SCHEDULE FOR CONSTRUCTION CONTRACTS. Show in the schedule the sequence in which the Contractor proposes to perform the work and dates on which the Contractor contemplates starting and completing all schedule activities. The scheduling of the entire project, including the design and construction sequences, is required....”

3.2 BASIS FOR PAYMENT AND COST LOADING

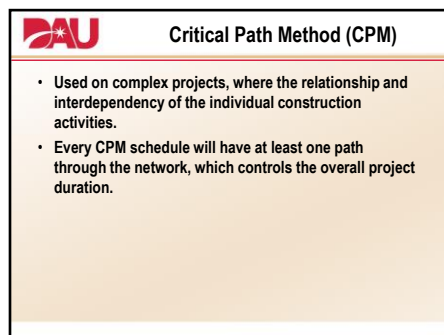
Use the schedule as the basis for determining contract earnings during each update period and therefore the amount of each progress payment. Lack of an approved schedule update, or qualified scheduling personnel, will result in the inability of the Contracting Officer to evaluate contract earned value for the purposes of payment²



Advantages of Schedule Types

Some of the advantages of using the bar chart method include:

- Simple to use
- Inexpensive
- Easy to understand
- Able to show some (limited) interdependency among tasks
- Suitable for less complex construction projects



Some of the advantages of using the CPM method include:

- Shows a high degree of interdependency among tasks
- Able to show cause and effect
- Able to show impacts and delays
- Separates float time and critical activities
- Used for more complex construction projects

¹ http://www.wbdg.org/ccb/browse_cat.php?c=3

² <http://www.wbdg.org/ccb/DOD/UFGS/UFGS%2001%2032%2001.00%2010.pdf>

Bar Chart - Development

“BAR CHART” METHOD

Development of a Bar Chart Schedule

Bar charting is a simple planning technique that is widely used on construction projects as an economic control tool. The schedule, essentially, plots progress by comparing the actual work completed to the work that was targeted (scheduled) to be completed. It is easily prepared and updated, and can be used as a stand-alone document.

Step 1. Chart Layout

The main portion of the bar chart schedule is comprised of a series of vertical columns to accommodate the entire project duration. On the left side of the chart are 2 columns, one for the individual construction activities, and the other for percentage of project completion. On the right side of the chart, following the last month on the schedule is a column for total dollars accumulated. The schedule is illustrated in Figure -1. This exhibit has been set up to represent a 4½-month project for the construction of a vehicle maintenance facility.

ACTIVITY	%	JAN	FEB	MAR	APR	MAY	\$ ACCUM
STR EXCAV	100 -						-KT AMT
	90 -						-
CONCRETE	80 -						-
	70 -						-
ROUGH CARP	60 -						-
	50 -						-
FINISH CARP	40 -						-
	30 -						-
MECHANICAL	20 -						-
	10 -						-
ELECTRICAL	0 -						-
INSTRUMENT							

LEGEND:

BARS: TARGET  ACTUAL 
 'S' CURVE: TARGET  ACTUAL 

Figure 1

Step 2. Activity Identification

The second step breaks the project down into specific major activities, much the same as is done when setting up a CPM chart. Each activity is assigned a duration, which represents the length of time required to perform the activity. Somebody knowledgeable or experienced in construction determines the duration chosen.

Duration is based on:

Complexity of the work

Volume of work

Crew sizes available

The activities are normally placed on the chart in general order of precedence, with the earliest on top and the latest on the bottom. Next, the date that each activity can (or should) begin is determined, taking into consideration the submittal review time, material purchase and delivery, planned utility outages, and so on. An estimated dollar value (including material, labor, and equipment) for each activity should also be determined. The sum of the estimated values should equal the contract price.

Step 3. Activity Placement

The third step is to place the activities on the chart. List the activities according to the general precedence in which they are to start. Review the chart for coherent logic. If the relationship of one activity to another is unreasonable, adjust as necessary. Review the project duration for reasonableness. Figure-2 illustrates the set up of the bar chart to this point. The numbers beneath the bars indicate the percentage of completion for each activity at the end of each month. This exhibit also includes the “S” curve, a standard feature of bar charts. The “S” curve will be discussed in step 4.

Step 4. Drawing the “S” Curve

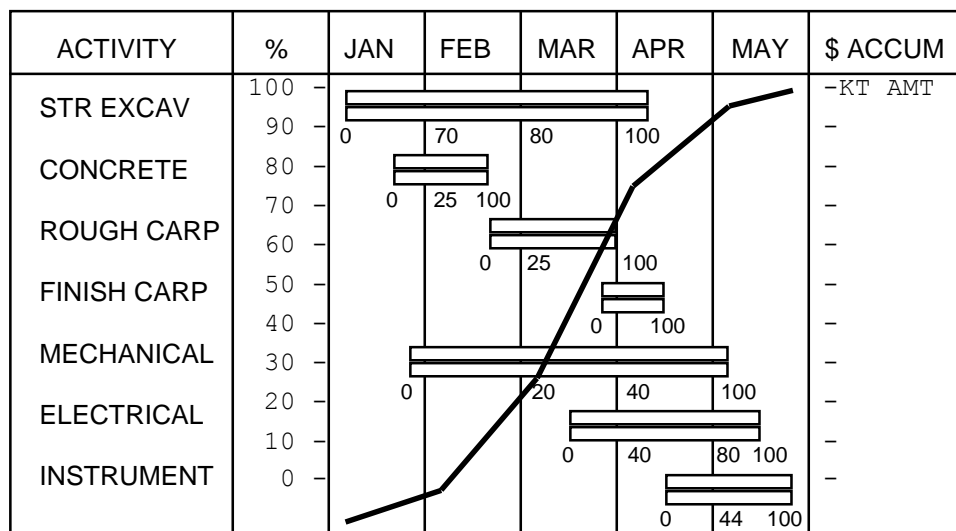
The fourth step is to determine the accumulated percentage of project completion for each month of the project. As each point is plotted along the monthly axis corresponding to the accumulated percent complete, the lines between these points will generally take on a curve in the shape of an “S” when connected together. The accumulated percentage of completion is determined by:

Choosing each monthly axis line and identifying the activities it crosses. The point in time where the monthly axis crosses the activity.

Multiplying the percentage complete (in decimal form) by the estimated dollar value of each activity.

The sum of these values added together and divided by the total contract value to obtain the accumulated percentage of completion.

Plotting the value for each respective month and connecting the points.

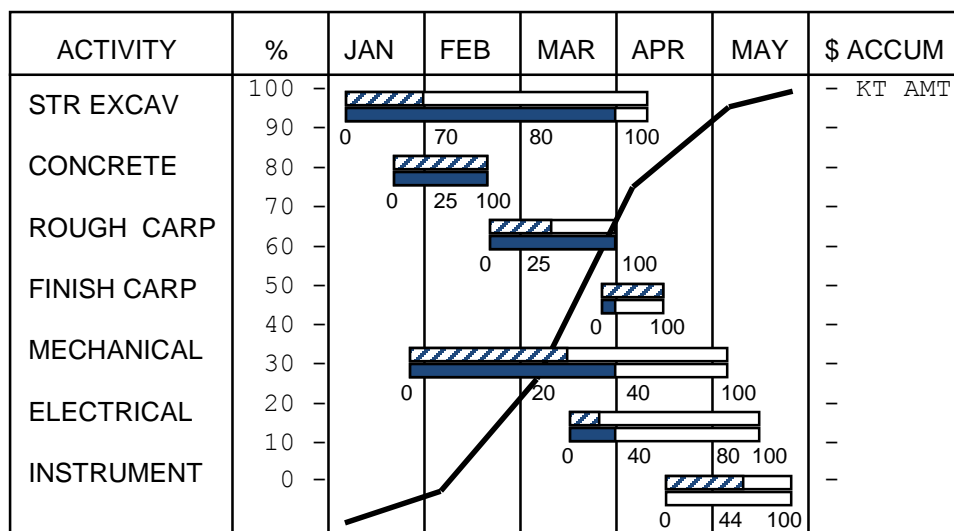


LEGEND:

BARS: TARGET ACTUAL

'S' CURVE: TARGET ACTUAL

Figure 2



LEGEND:

BARS: TARGET ACTUAL

'S' CURVE: TARGET ACTUAL

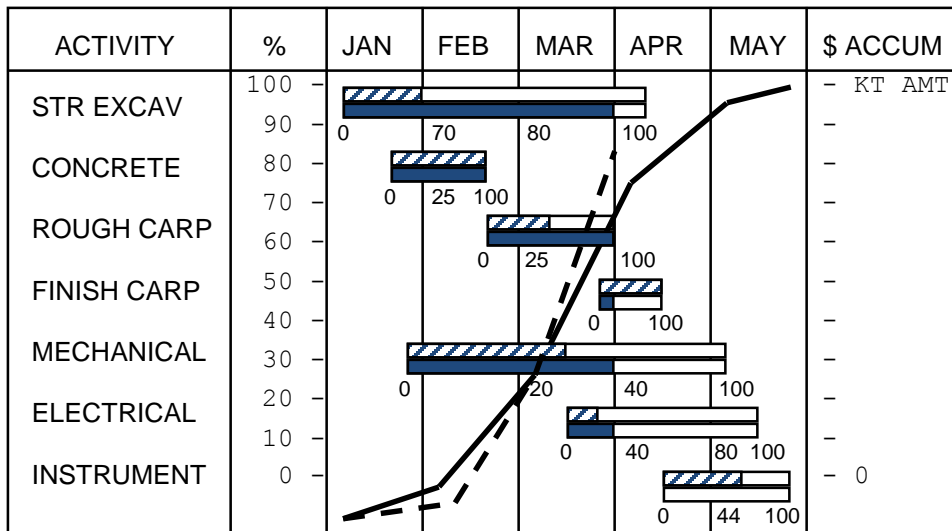
Figure 3

Updating Bar Charts

The updating of bar charts is a simple process once the chart is put together. Each activity bar will have a space in which to draw in the actual progress each month. Updating the chart involves two steps.

Step 1. Determine Percentage of Project Completion

For each activity, determine the actual percent of completion. This is done by estimating the actual progress in the field. Sketch this percent on the top bar for each activity using hatched symbols. Sketch the planned (scheduled) percent complete on the bottom bar using a solid color fill. Figure 3 illustrates an update to the bar chart, indicating progress as of the end March.



LEGEND:

BARS: TARGET (solid bar) ACTUAL (hatched bar)
 'S' CURVE: TARGET (solid line) ACTUAL (dashed line)

Figure 4


Step 2. Draw the "S" Curve

Using the actual percentage of completion, follow the same steps outlined in step four. Use a different color line or style to plot the actual progress as opposed to the scheduled progress. Comparing the actual accumulated percentage with the schedule will readily inform you how far the contractor is behind or ahead of schedule. Multiplying the actual percent complete by the contract value will result in an amount known as work-in-place (WIP). Figure 4 illustrates the placement of the updated "S" curve on the bar chart.

Optional Exercise – Work Breakdown Structure – Bar Chart

This exercise is optional depending on time. It has been put at the end of the lesson on starting on page 67.

Critical Path Method Development



Critical Path Method (CPM)

- This path represents the route of longest combined duration through the diagram.
- The route is referred to as the "critical path," since any delay in a construction activity on the path will result in an increase of the project's overall duration.
- For those activities not on the critical path, there exists some amount of flexibility as to when each one can start or finish without affecting the overall project duration. This flexibility is known as "float", and can be calculated for each activity.

Description

The Critical Path Method (CPM) of construction scheduling is typically used on more complex projects, when a simple bar chart is insufficient to indicate the relationship and interdependency of the individual construction activities. Every CPM schedule (also called a network) will have at least one path through the network that controls the overall project duration. This will be the route (also called a pathway) of longest combined duration through the

diagram. This route is known as the critical path, since any delay in a construction activity on that path will result in an increase of the project's overall duration. For those activities not on the critical path, there exists some amount of flexibility as to when each one can start or finish without affecting the overall project duration. This flexibility is known as float. The amount of float for each activity can be calculated.

The following paragraphs describe the process of setting up a CPM schedule. For purposes of this instruction, presume that you are administering a contract to construct a vehicle maintenance garage. The initial steps of the process (summarized in exhibit A-5) have been completed for you, including:

Identifying all the individual construction activities,

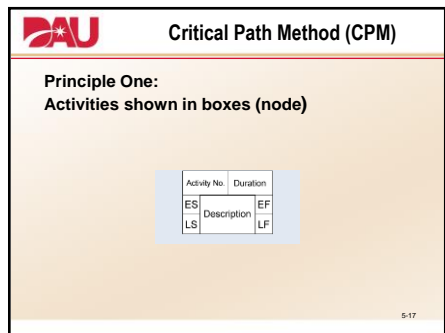
Establishing precedence (interdependency), and Determining activity durations.

The next step is to transform this information into a graphic representation of the schedule. This graphic display will show the interdependency of the activities much more clearly. There are three basic principles that govern the construction of a CPM schedule:

PROJECT ACTIVITY LIST			
Activity	Name	Duration	Depends On
A	Mobilize	1 Day	START
B	Deliver Material	7	A
C	Excavate & Form Footings	6	A
D	Pour Footings	2	B, C
E	Rough Framing	5	D
F	Rough Electrical	2	E
G	Install Door & Window	1	E
H	Install Roof	3	E
I	Install Siding	3	H
J	Paint Interior	2	F, G
K	Finished Electrical	1	J
L	Paint Exterior	2	G, I
M	Cleanup	1	K, L, N
N	Construct Driveway	3	D

Figure 1

Principle One: Activities are shown as nodes.



Occasionally, CPM charts are set up with arrows and nodes. The arrows represent individual construction activities, and the nodes (which connect a series of arrows) represent points in time at which events occur. These events are usually the beginning of construction activities.

Activity		Duration
ES	Description	EF
LS		LF

Figure 2

More often, CPM charts are set up with boxes and arrows. The boxes (also called activity blocks) represent individual construction activities, and the arrows are used to connect the activities in a logical sequence. The boxes contain information regarding the duration and timing of the activity. Figure-6 shows a typical construction activity block. Each of the items in the block will be explained in detail later in this appendix.

DAU Critical Path Method (CPM)

Principle Two:
All future activity depends on completion of all preceding activities

Activity No.	Duration
ES	EF
LS	LF

1010	7
1	8
1	8

5-17

Principle Two: All activity depends upon and cannot begin until the completion of all preceding activities. This principle strikes at the heart of the CPM schedule technique. The relationship between the various construction activities determines the precedence in which they are to occur. The CPM network is established by determining the precedence of all the activities. This is shown graphically by connecting the activity blocks with arrows. For example, the table in exhibit A-5 indicates that activity “B” (deliver material)

cannot begin until activity “A” (mobilize) is completed. In the CPM network, this would be shown by drawing an arrow from block A to block B.

Each construction activity is identified by using an event number in the upper left corner of the activity block. No more than one activity may have the same activity number. The assigned activity numbers should increase as progress moves from one activity to the next throughout the network. Activities should be numbered with gaps, allowing for additional activities to be inserted later (should changes occur) while maintaining numerical order.

Using this principle, the construction schedule for the vehicle maintenance garage project would look like the CPM network illustrated in Exhibit A-7. Notice that each activity is placed on the schedule according to the precedence established in exhibit A-5, and that the activities have been assigned numbers (1000, 1010, 1020, etc.) to replace the letters previously assigned (A, B, C, etc.).

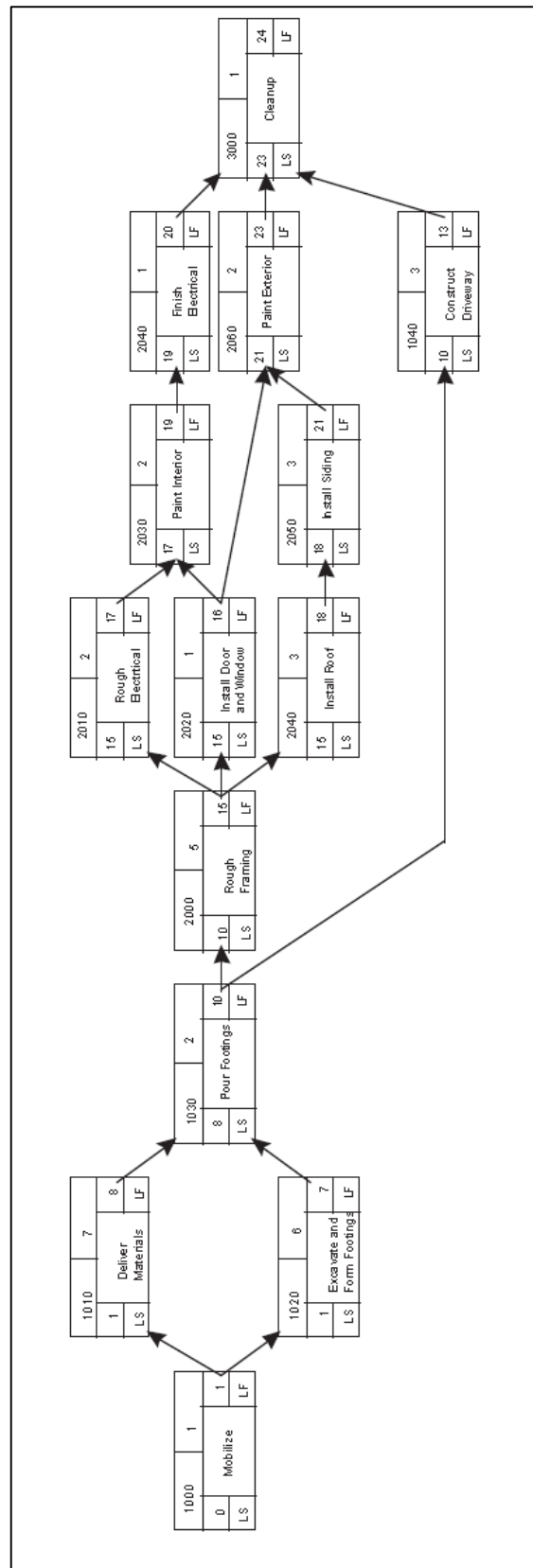
DAU Critical Path Method (CPM)


Principle three:
All activities begin and end at a describable point in time

Principle Three: All activities begin and end at some point in time.

The scheduled start and finish dates of each construction activity are shown on the activity block. The item denoted as “ES” indicates the early start date, which is the earliest point in time when that particular activity could occur. While in reality the activities begin at the start of a particular day, the “ES” date is shown as the end of the previous day. For example, the first activity in any project actually begins

at the start of day #1, but it is shown on the CPM as beginning at the end of day #0. Next, the early finish (“EF”) is calculated by adding the activity duration to the early start date. Thus, for the vehicle maintenance garage, activity 1000 (mobilization) has an early start date of 0 (the activity starts at the end of day #0) and an early finish date of 3 (the activity is completed at the end of day #3).






CPM Network Calculations

- CPM provides the ability to determine:
 - Earliest date of project completion;
 - Latest date of project completion if there are no changes;
 - Impact on the project completion date of delaying a specific activity;
 - Critical activities for completing the project on or before the completion date;

The early start for the remaining construction activities are determined by examining the precedence of the activities. The early start date for a particular activity is the largest of the early finish dates for all prior activities. For example, activity 1030 (pour footings) has an early start date of 8 (the larger of the early finish for activities 1010 and 1020).



CPM Network Calculations

- Process:
 - Perform a Forward Pass
 - Perform a Backward Pass
 - Calculate Total Float for each activity
 - Calculate Free Float
 - Identify the Critical Path

CPM Network Calculations


One of the advantages of CPM scheduling is that it provides the ability to determine the: Earliest date the project can be completed,

Latest date the project should be completed if no changes occur,

Impact on the project completion date of delaying a specific activity, and

Critical activities for completing the project on or before the completion date.

These aspects of the project schedule are determined by making 3 basic computations, one of which is the forward pass discussed in principle #3. The next computation used in CPM networks is the *backward pass*, which is similar to the forward pass, but is used to determine the *late start* (“LS”) and *late finish* (“LF”) dates for the various construction activities. The late finish date represents the latest an activity can finish without changing the project completion date. And the amount of *float or slack time*




Forward Pass

- Forward Pass (beginning to end; L=>R)
 - Determines duration of project
 - Start time of the project is Day Zero (0).
 - Early Finish time of each task is its Early Start time plus its estimated duration.
 - Early Start time of tasks is the Early Finish of the immediate preceding task.
 - Events having more than one predecessor task occur when ALL predecessor dependencies have been met.


Forward Pass

Proceed through the network, determining the early start and early finish dates of each construction activity. This is known as a *forward pass*, because calculations are performed as you move forward in time through the project. The early finish date of the final construction activity is known as the *project duration*. It represents the total length of time required to complete the project.


Forward Pass

- Early Finish = Early Start + Duration
 - $EF = ES + DUR$


The results of the forward pass for our vehicle maintenance garage are shown in Figure-8. The project duration is 24 days.


Backward Pass

- Backward Pass (end to beginning; $R \Rightarrow L$)
 - Determines critical path & float activities
 - Project Late Finish time is taken from the Forward Pass calculation of the project Early Finish time.
 - Task Late Start time is calculated by subtracting estimated task duration from Late Finish time.
 - The Late Finish time of each predecessor task is the Late Start of its immediate successor task.
 - Activities having more than one successor task must occur soon enough to meet all successor dependencies by Project Late Finish time.


Backward Pass

To begin the backward pass, the last activity in the network is assigned a late finish date equal to the early finish date. The late start date is then calculated by subtracting the duration from the late finish date. In our vehicle maintenance garage project, the last activity (cleanup) has an early finish on day #24. Therefore the late finish is also 24, and the late start is 23.


Backward Pass

- Late Start = Late Finish - Duration
 - $LS = LF - DUR$

The late finish for the remaining construction activities is determined by examining the precedence of the activities. The late finish date for a particular activity is the smallest of the late start dates for all follow-on activities. For example, activity 2020 (install door and window) has a late finish date of 20 (the smaller of the late start for activities 2030 and 2060). The results of the backward pass are shown in exhibit A-9.


Float

- Float
- $FLOAT = Late\ Finish - Early\ Finish$
- Float (or slack) is the amount of time that an individual schedule activity can be delayed without delaying the project finish date.

Determining Free Float and Total Float

The third computation used in CPM scheduling is the determination of *float* time. Activities not on the critical path have some amount of flexibility as to when they can be performed. The activity may actually start later than its scheduled ES date without changing follow-on activities or the overall project duration. This amount of flexibility is known as *float*.

DAU	Float
• Total Float = Late Start - Early Start	– $TF = LS - ES$
• Free Float = Early Start (Next Activity) - Early Finish	– $FF(x) = ES(x+1) - EF(x)$

There are 2 kinds of float:

Total float is the number of days an activity can be delayed without affecting the overall project duration. It is calculated by subtracting the early start date from the late start date. For example, activity 2020 (install door and window) has 4 days of total float.

Free float is the number of days an activity can be delayed without affecting the early start date of the next follow-on activity. It is calculated by subtracting the early start of the follow-on activity from the early finish. For example, activity 2020 (install door and window) has 1 day of free float (compare EF for 2020 with ES for 2030).

DAU	The Critical Path
• The Critical Path:	– Identifying the Critical Path
	» The series of schedule activities that determines the duration of the project.
	» Generally, the longest path through the project.
	» Usually defined by the schedule activities with zero float (critical path activities).

Critical Path

In the final network, there are a number of pathways of construction activities leading from the beginning to the end of the project. On at least one of these paths, all the activities will have ES dates equal to their LS dates. This is called the *critical path*. It is nothing more than the longest path through the network based on the activity durations and their logical relationships (precedence).

The critical path determines the project duration. Any change in duration on an activity along the critical path will affect the project completion date. The critical path in our vehicle maintenance garage is shown in exhibit A-10.

All activities on the critical path have zero float. All non-critical activities may have float ranging from zero to a high of one less than the project duration.

Summary of CPM Calculations

Early Finish = Early Start + Duration

$$EF = ES + DUR$$

Late Start = Late Finish - Duration

$$LS = LF - DUR$$

Total Float = Late Start - Early Start

$$TF = LS - ES$$

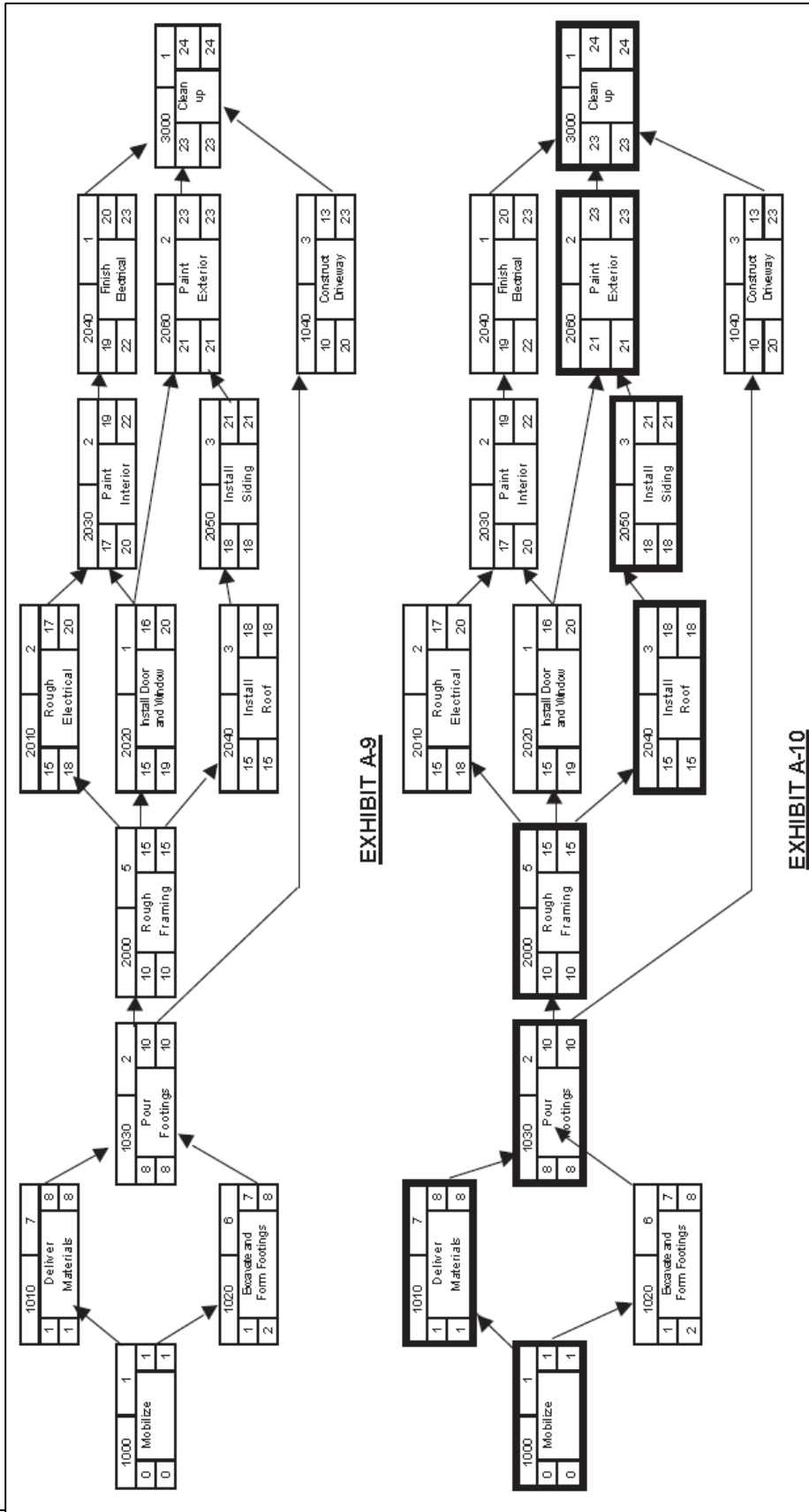
Free Float = Early Start (Next Activity) - Early Finish


$$FF(x) = ES(x+1) - EF(x)$$

The process of calculating these dates, although not difficult, can be time consuming and tedious if done manually. Fortunately, the development of personal computers has offered some relief in performing much of this task. The only information that you need to input into the computer is the activity name, duration, order of precedence, and the earliest start date for the project. On the basis of this information, the computer will calculate all of the start dates, finish dates, float, and the critical path.

Conclusion

Remember, the network is only as good as the information used in developing the network. The true value of a network diagram is measured in the accuracy in identifying activities, estimating their durations, and determining their order of precedence.




Actions to Shorten the Critical Path


- Schedule Compression Techniques
 - Fast Tracking
 - » Planning and/or overlapping sequential activities to be performed in parallel.
 - Crashing
 - » Analyzing cost and schedule trade-offs to achieve reductions in schedule activity durations
 - » Generally requires additional resources and person-hours
 - » Increases costs
 - » Must produce a shorter critical path to be visible (non-critical path activities can be crashed, but may not provide an overall benefit).

Schedule Compression Techniques

Fast Tracking is technique that deliberately plans for overlapping sequential activities and for actions to be performed in parallel.

Crashing is a technique that analyzes cost and schedule trade-offs to achieve reductions in schedule activity durations. Crashing a schedule generally requires additional resources and person-hours


which increases costs. However the tradeoff is that this can produce a shorter critical path. This may or may not provide an overall benefit.


CPM Advantages

Advantages: (complex projects)

- Accepted as evidence in court
- Shows high degree of task interdependence
- Shows cause & effect, impact & delay
- Separate float time and critical activities

The main advantage of a CPM schedule is realized on highly complex projects. These cannot be managed effectively without a formal dependency network analysis. The CPM technique is the only one accepted as evidence in court because it shows a high degree of task interdependence, the cause & effect, of schedule impact & delays and allows for the formal calculation of float time and critical activities


Schedule Initial Reviews

- Factors to Consider
 - Total duration conforms to contract duration
 - Identifies critical activities for contractor and government
 - Reasonable duration of specific activities and sequence "logic"
 - Sufficiently demonstrate activity relationships to support delay analysis
 - Permit adequate detail to allow for progress review and payments

Factors to Consider during Government review:

- Total duration shown conforms to contract duration
- Identifies critical activities for both contractor and government
- Reasonable duration of specific activities and sequence "logic"
- Sufficiently demonstrate activity relationships to support delay analysis
- Permit adequate detail to allow for progress review and payments

Exercise – Work Breakdown Structure – Critical Path MethodWork Breakdown Structure (WBS) Exercise

Task: Prepare a WBS for the building of a one-story home on a piece of raw land that you own.

Level 2 of the WBS – Number these WBS's in the logical order they would occur (100, 200, 300 or 1000, 2000, 3000 ...)

Site Work

Exterior Construction

Interior Construction

Finishes

Furniture, Fixtures, and Equipment

Activities (in random order) - Sort all these activities under one of the five level 2 WBS's that it would most logically correspond in the order it would occur. Then number them (101, 102, 103... 201, 202, 203 ...301, 410, and 501 etc.)

Install plumbing	Install the heat pump/AC unit
Install electrical wiring	Install all appliances
Erect the house frame	Clear the site
Survey the site	Install the HVAC ductwork
Paint the interior	Install the drywall
Install carpet and tile	Install the roofing trusses & shingles
Install cabinets	Install the flooring joist & boards
Paint the exterior	Install exterior siding
Form and place the foundation	Form and place the driveway
Level and grade the site	Landscape the yard
Install lighting fixtures	Install plumbing fixtures

Place the activities in order of priority or action.

	1	2	3	4	5
Order	Site Work	Exterior Construction	Interior Construction	Finishes	Furniture, Fixtures, and Equipment
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Network Scheduling Exercise

Task:

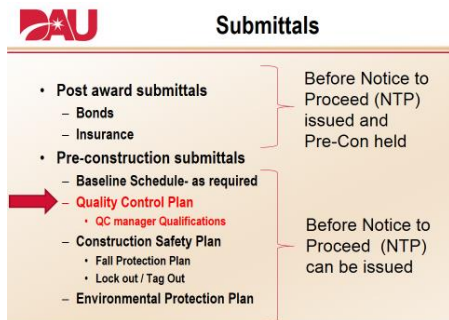
Create a CPM Schedule for the WBS involving the building of a one-story home on a piece of raw land that you own. After you layout your network you will need to prepare a forward and backward pass to determine the critical path(s) through your network. Remember all activities must be attached to another activities on both sides except the beginning and ending activities.

Activities (in random order)

Install plumbing (3 days)	Install the heat pump/AC unit (2 days)
Install electrical wiring (5 days)	Install all appliances (2 days)
Erect the house frame (25 days)	Clear the site (1 day)
Survey the site (1day)	Install the HVAC ductwork (4 days)
Paint the interior (5 days + 2 days lag)	Install the drywall (10 days)
Install carpet and tile (2 days)	Install the roofing trusses (4 days)
Install cabinets (2 days)	Install the flooring joist & boards (5 days)
Paint the exterior (1 day + 2 days lag)	Install exterior siding (4 days)
Form and pour the foundation (2 days + 3 days lag)	Form and place the driveway (2 days + 2 days lag)
Level and grade the site (1 day)	Landscape the yard (2 days)
Install lighting fixtures (2 days)	Install plumbing fixtures (2 days)

Exercise Work Area

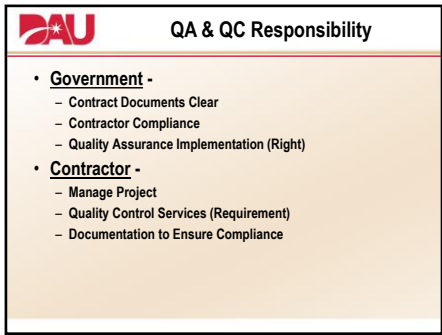
Submittals – Quality Control / Quality Assurance



In the previous lesson we awarded the construction contract. In this lesson we will begin the processes for construction contract administration. Before any work begins, there are a number of concepts and processes about construction contract administration for which contracting personnel should be aware.

FAR part 36 Clauses

Certain special construction clauses aid in insuring the responsibility for both the Government and the contractor providing a quality product are met. Responsibility for construction is clause mandated with the Inspection of Construction Clause.



Quality Management Policy

Obtaining quality construction is a combined responsibility of the construction contractor and the Government. Their mutual goal must be a quality end product conforming to the contract requirements.

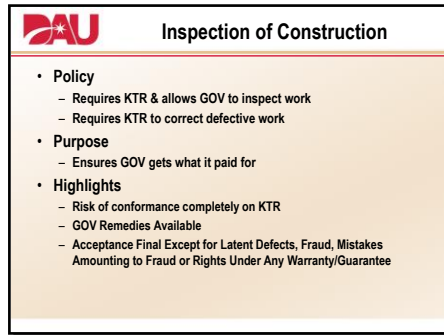
Government responsibilities

Contracting Officers are responsible for assuring contractors comply with the contract documents and produce the required end product.

Contractor responsibilities

Contractors are responsible for quality control; i.e., all activities necessary to manage, control, and document work so as to ensure compliance with the contract plans and specifications.

ISO 9000 provides another “system” for controlling quality. Currently, DoD construction contracting is exploring using ISO 9000 for ensuring quality construction projects. If a construction contract project or construction contractor for a project is ISO 9000 certified, refer to agency policy regarding Quality Management.



Introduction

The Inspection of Construction Clause FAR 52.246-12 establishes the requirement for Quality Control in all construction contracts. The Government determines the type and extent of contract quality assurance required (DFARS 246.102) and includes inspection and warranty clauses as appropriate (FAR 46.102(a)).

Policy

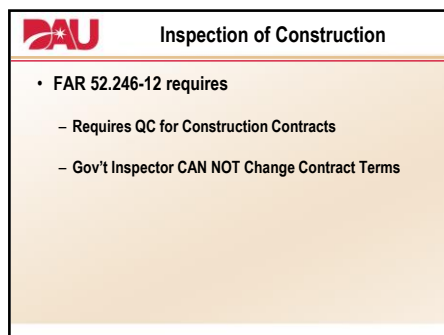
Paragraph (b) of this clause requires the contractor to maintain an inspection system and establishes the right of the government to inspect the work.

Paragraph (e) of this clause requires the government to perform its inspections in a manner that will not unduly delay the contractor.

Paragraph (f) provides protection for the government by requiring the contractor to correct defective work at no cost to the government.

Purpose

This clause establishes specific contractor inspection responsibilities and certain government inspection rights, to ensure that the government gets what the contract requires.



Clause Highlights

Paragraph (c) places the risk of conformance on the contractor, even if the government has inspected the work.

Paragraph (g) establishes government remedies if the contractor fails to correct rejected work. The government can either: replace the work itself (with

in-house forces or by contract) and charge the cost to the contractor, or terminate for default the contractor's right to proceed

Paragraph (l) states that Government **acceptance shall be final** and conclusive except for latent defects, fraud, gross mistakes amounting to fraud, or the Government's rights under any warranty or guarantee.

Application of the Clause - Questions

1. *What if the work is covered up, which party pays to knock a hole in the wall so the government can inspect behind it? If the work is defective? If the work conforms.....?*

2. *Just because the government inspects an item, does that mean it has been accepted?*

3. *What if the contractor has a government approved material submittal that differs from the specifications and at the final inspection the government finds out the item doesn't conform to the specifications? Who pays to have the material replaced?*

4. *What if the contract includes 10,000 cubic yards of soil that is to be decontaminated, and the government inspector finds 1 cubic yard that is not properly decontaminated? Can the government reject all of the soil?*

At what point could the government reject all of it?

Specifications and Drawings for Construction FAR 52.236-21




This clause requires the Contractor to keep specifications and drawings on site. If a difference exists, the specifications govern. The contractor unilaterally resolves discrepancies at his own risk, including any costs incurred.

Subparagraph (d) and (e) of the clause requires Shop drawings to show details of fabrication or installation and be submitted to the Government. The contractor must coordinate, review and approve shop drawings prior to submittal. The Contracting Officer may approve or disapprove the shop drawings; however, approval does not relieve the contractor of responsibility for conformance. Variations from contract requirements must be identified; approval of variations may include a deductive modification after discussions with the contractor.

Material and Workmanship FAR 52.236-5

As prescribed in FAR 36.505


**Material & Workmanship**

- FAR 52.236-5 requires
 - New materials, equipment & articles of suitable grade for the project
 - Contractor Shall Obtain Government Approval of Machinery/Equipment to be Incorporated into the work
 - All work to be performed in skillful and workmanlike manner. References in Specifications Regard as Establishing a Standard
 - Allow the Contracting Officer to Removal of Unqualified or Objectionable Employees

(a) All equipment, material, and articles incorporated into the work covered by this contract shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in this contract. References in the specifications to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition. The


Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of the Contracting Officer, is equal to that named in the specifications, unless otherwise specifically provided in this contract.

(b) The Contractor shall obtain the Contracting Officer's approval of the machinery and mechanical and other equipment to be incorporated into the work. When requesting approval, the Contractor shall furnish to the Contracting Officer the name of the manufacturer, the model number, and other information concerning the performance, capacity, nature, and rating of the machinery and mechanical and other equipment. When required by this contract or by the Contracting Officer, the Contractor shall also obtain the Contracting Officer's approval of the material or articles which the Contractor contemplates incorporating into the work. When requesting approval, the Contractor shall provide full information concerning the material or articles. When directed to do so, the Contractor shall submit samples for approval at the Contractor's expense, with all shipping charges prepaid. Machinery, equipment, material, and articles that do not have the required approval shall be installed or used at the risk of subsequent rejection.

**Material & Workmanship**

- Establishes the Submittal Process
 - Contractor Submits Log for Approval or A/E Provides Log
 - Either Gov't or KTR Approve Submittals
 - Gov't Receives Info Copy of KTR Approved Submittals
 - The specs will usually state the amount of time for the review. If not stated the courts will use precedent to determine a reasonable time period for review
 - If either party is late in its review and the review period is on the critical path the make be a delay to the contract

(c) All work under this contract shall be performed in a skillful and workmanlike manner. The Contracting Officer may require, in writing, that the Contractor remove from the work any employee the Contracting Officer deems incompetent, careless, or otherwise objectionable.




Material & Workmanship

- If the Government rejects the contractor's submittal it bears the burden of proving that its rejection was proper, if the issue ends up in litigation.
- The government can meet its burden by showing that the submittal failed to meet one or more of the contract prescribed requirements.
- The problem with Government Approval = Accepted
- Reduces Risk for Contractor

The Construction Submittal Process: The submittal requirements are compiled from the specifications. The contractor prepares the "Submittal Log" or register and submits for approval (Alternate procedure: A-E compiles requirements and includes log/register in the specification) all designated items. As may be stated in the specifications, either the QC representative or the Government are assigned authority to approve the submittal. On QC approved submittals, the Government receives an information

copy for review and record purposes.

Specifications normally require that all submittals for a given specification section or system be submitted together. After review and recommendation, the Government returns the submittal to the contractor either as: approved, approved with corrections noted, or disapproved, resubmittal required. The Government has a reasonable time for review. The submittal process is intended to reduce the risk for the contractor.



Quality Control: UFGS 01 45 00.00

- 3.2 QUALITY CONTROL PLAN
 - 3.2.1 Content of the CQC Plan
- Construction Design and construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started.
- 3.4 QUALITY CONTROL ORGANIZATION
 - 3.4.1 Personnel Requirements
 - 3.4.2 CQC System Manager
 - 3.4.3 CQC Personnel

Construction Quality Management System


UFGS 01 45 00.00 Paragraph 3.2

"Establish and maintain an effective quality control (QC) system in compliance with the Contract Clause titled "Inspection of Construction."

QC consists of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. Cover all construction design and construction operations, both onsite and offsite, and be keyed to the proposed construction design and construction sequence.

The project superintendent will be held responsible for the quality of work and is subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the contract."³


³ <http://www.wbdg.org/ccb/DOD/UFGS/UFGS%2001%2045%2000.00%2010.pdf>



Quality Control: UFGS 01 45 00.00

- 3.6 CONTROL
 - 3.6.1 Preparatory Phase
 - 3.6.2 Initial Phase
 - 3.6.3 Follow-up Phase
 - 3.6.4 Additional Preparatory and Initial Phases
- Requires the Contractor to Plan and Schedule Work to Ensure They are Contractually Prepared To Start Each New Definable Feature of Work (DFOW).

The Construction Quality Management System's purpose is to have the Government and Contractor better plan and schedule work for the project by defining various phases for controlling quality during the life of the project. The three phases of the quality control process – preparatory, initial, and follow-up – are the core of the Construction Quality Management System.



Phase 1 - Preparatory


- Paragraph 3.6.1: Prior to beginning work on each new DFOW contractor must:
 - Obtain approval of drawings, test reports, mix designs, etc
 - Review drawings and specifications and applicable building code requirements
 - Physical check of onsite material and equipment
 - Hazardous analysis/avoidance
 - Review Pre-Construction Activities and coordinate with government personnel

The Preparatory Phase

This phase applies to pre-construction activities -- those actions that are performed before any physical work begins. Types of preparatory actions include:

Physical checks of onsite material and equipment for contract compliance, and Approval of shop drawings, test reports, and mix designs.

The QA Representative must conduct advance surveillance to make sure the contractor has satisfied all preparatory requirements before beginning construction. The contractor and the Government should complete a preparatory phase conference for each definable feature of work before any construction activity begins.




Phase 2 - Initial

- Paragraph 3.6.2 At the beginning of a DFOW contractor must:
 - Check the work, verify adequacy, establish workmanship standards
 - Resolve differences
 - Check Safety Program compliance
 - Coordinate inspection with government

The Initial Phase

This phase is required at the beginning of the construction operation and is intended to get the actual work properly underway. It is workmanship oriented, and is the point in the process where workmanship standards are established. Additionally the safety program properly addresses the safety and risk assessments.

The initial phase is of such importance that if the contractor should, at any time, change the onsite supervisor for a feature of work, the Government should insist on an initial phase conference. This subsequent conference assures all parties again have a clear understanding of required workmanship standards.



Phase 3 – Follow-Up

- Paragraph 3.6.3 Perform checks to assure quality control - Continuous Action Throughout Project
- Routine Checks To Ensure Compliance
- Correct deficiencies
- Do not build on non-conforming work

The Follow-up Phase

This is a continuous action throughout the construction project. Follow-up involves routine checks to ensure that previously established guidelines to assure contract compliance are being followed. If preceded by thorough Preparatory and Initial Phases, this phase is more effective and productive.



Quality Control Plan

- Received, Reviewed and Formally Accepted **PRIOR** to Performance and Should Address:
 - Qualifications QC personnel
 - Address QC Activities for Prime, Subs, Material Suppliers & Testing
 - Single Point of Contact

Quality Control Documents

Special construction contract clauses and the Construction Quality Management System aid in acquiring a construction quality product. In construction contracting documentation of quality is necessary. Discussed below are some of the forms for construction quality documentation.

Quality Control Plan

The Contractor's QC Plan is the foundation upon which quality work is based. It is an outline of the planned quality control procedures for the specific construction project and is vital to the quality control program. The plan must be comprehensive, detailed and logical if the contractor's quality control program is to be effective. While experience and knowledge of the construction industry are necessary in developing a good QC Plan, the contractor must consider fully the specific contract requirements and special factors peculiar to a project as well.

The contractor's QC Plan must be received, reviewed and formally accepted by the Contracting Officer before any construction begins.

Quality Control Plan Components:

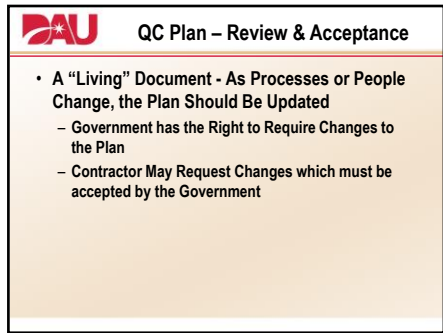
The contractor's QC organization must be identified. The contractor must provide sufficient quality control personnel to satisfy all contract requirements. The contractor's quality control staff may vary in size, depending on the work being performed at a point in time.

Qualifications of individual quality control personnel must be addressed. The name, classification and qualifications of each member of the contractor's quality control team must be submitted, together with assigned individual duties, responsibilities and authorities. This information may be provided in phases, as work progresses.

The plan must contain assigned quality control activities for performance by the prime contractor, subcontractor(s), off-site fabricators, and suppliers. Further, if the contractor delegates certain quality control responsibilities, the plan must indicate how the effectiveness of the quality control efforts of the subcontractor(s), off-site fabricators, or suppliers will be assured.

Performance of control testing is to be included in the plan. If technicians employed by the contractor will be performing the tests, the plan must indicate who will perform specific tests and their qualifications. Specifics relative to test report submissions are addressed in the QC Plan, including guidelines on format, content and consistency of all documentation to be submitted to the Government. The plan should contain procedures to be followed in giving advance notice to the Government of the times when special tests will be conducted.

The contractor must assign a single point of contact for quality control. The QC Plan must contain a letter of direction to the contractor's quality control point of contact, specifying duties, responsibilities, and authorities. A responsible officer of the contractor's firm should sign this letter that designates authority.



Government Directed Changes to the QC Plan

If changes to the plan are necessary, the changes must be made before the plan can be accepted. It must be made clear to the contractor that acceptance of the plan is dependent on satisfactory QC performance once construction is underway. The Government should always reserve the right to require necessary changes in the QC Plan and in contractor operations to obtain the specified level of quality. Even after the plan has been

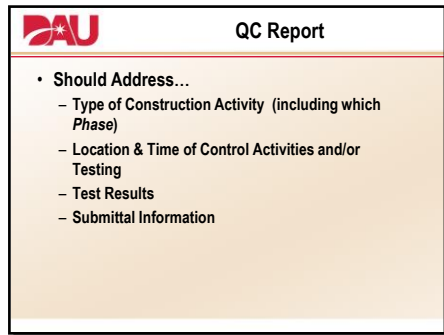
accepted, if some part of the plan is not working, the Government can require changes to be made, and the contractor should be made aware of the Government's right to require these changes.

Contractor Changes to the QC Plan

If the contractor wants to make changes in the QC Plan during construction, the Government must be notified in writing. The contractor cannot implement any change until the contracting officer or their representative has formally accepted the changes in writing.

QC Plan Implementation

Assuring the Quality Control Plan is implemented is done by reviewing, analyzing, and cross referencing the Quality Control and the Quality Assurance Reports.



The Quality Control Report

A thorough reporting system is an indispensable quality management tool. In addition to identifying specific deficiencies, careful report analysis will also detect patterns in the contractor's performance. If these patterns are problematic, early detection and correction will save time, effort, and money for both the Government and the contractor.

The requirement for the contractor to submit daily QC reports will be stated in the Special Provisions of the contract. The QC Report is to be submitted to the QA at a prescribed time every day, and all information relating to QC activities is to be included in the report.

Major Elements in the QC Report include:

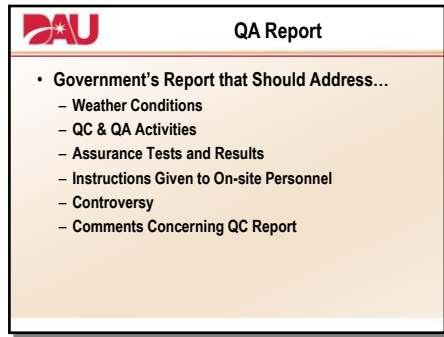
The type of construction underway at the time the report was made. For example, earthwork, concrete work, or structural steel erection would be noted. Also, the phase of the feature of work (preparatory, initial, or follow-up) should be noted.

Locations and times at which control activities and or check tests were made. The results of these control activities should be stated in detail. If discrepancies are discovered, these discrepancies should be listed, along with corrective actions that were made or will be taken.

Results of all tests. The results of all tests performed should be attached, along with the procedures used to conduct the tests. Test results should include details of failures encountered, and remedial action to be taken. If test results cannot be submitted with the same-day

QC report, the fact that tests were performed should be reported, with an expected due date for the test results. Delayed test results are then submitted with the QC Report on the date the results are received.

Submittal information. The information should include submittals approved and submitted, but pending approval.



The Quality Assurance Report

The QA Report is the Government's daily record of project-related events.

Similar to the QC Report, the QA Report must contain certain specific details, to include:

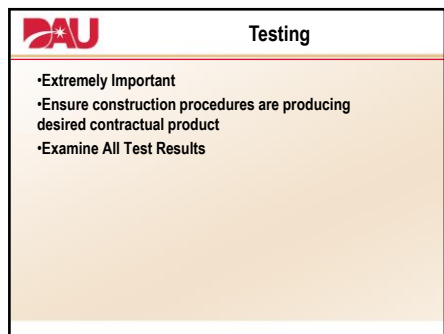
- Weather conditions for the day.
- QC activities and QA activities.
- Assurance tests and results.
- Instructions given to onsite contractor personnel.

The instructions should be recorded in detail, along with the person(s) to whom the instructions were given, and the reaction to the instructions.

Controversy. All details surrounding any points of controversy should be recorded at the time the differences are discovered.

Comments concerning QC Reports. The QC Report must not be altered in any way. Any comments concerning QC Reports are made on the QA Reports.

A suggested procedure for record keeping is to attach the QC and QA Reports together, along with any related test results, and file them in a daily summary.



Construction Test Reports

Testing is an extremely important part of QC. If tests are not performed properly, there are many construction procedures that cannot be confirmed as adequate. Visual observation alone, in some instances, may be insufficient.

All involved personnel should become aware of the methods used and the extent of construction contract testing. When construction begins, the

following questions should be answered before testing begins:

Has all control testing been identified?

Does the contractor understand the testing submittal requirements? Have laboratory

facilities and testing equipment been verified as contractually acceptable?

Are laboratory personnel qualified?

Has the calibration of equipment been verified as accurate?

A thorough examination must be made of any test reports submitted. Test Reports provide documentation that the tested construction project component meets the construction contract quality requirement.

Exercise – Quality Control

Identify the high value quality measures that you would anticipate on this project

<u>Activity</u>	<u>Quality Concerns</u>
<u>Survey the site</u>	
<u>Clear the site</u>	
<u>Level and grade the site</u>	
<u>Form and pour the foundation</u>	
<u>Install the flooring system</u>	
<u>Erect the house frame</u>	
<u>Install the roofing system</u>	
<u>Install exterior siding</u>	
<u>Install the heat pump</u>	
<u>Install the HVAC ductwork</u>	
<u>Install plumbing</u>	
<u>Install electrical wiring</u>	
<u>Install the drywall</u>	
<u>Paint the interior</u>	
<u>Install cabinets</u>	
<u>Install plumbing fixtures</u>	
<u>Install carpet and tile</u>	
<u>Install lighting fixtures</u>	
<u>Install all appliances</u>	
<u>Paint the exterior</u>	
<u>Form and place the driveway</u>	
<u>Landscape the yard</u>	

Submittals - Safety



52.236-13 -- Accident Prevention.

(a) *The Contractor shall provide and maintain work environments and procedures which will --*

(1) *Safeguard the public and Government personnel, property, materials, supplies, and equipment exposed to Contractor operations and activities;*

(2) *Avoid interruptions of Government operations and delays in project completion dates; and*

(3) *Control costs in the performance of this contract.*

(b) *For these purposes on contracts for construction or dismantling, demolition, or removal of improvements, the Contractor shall --*

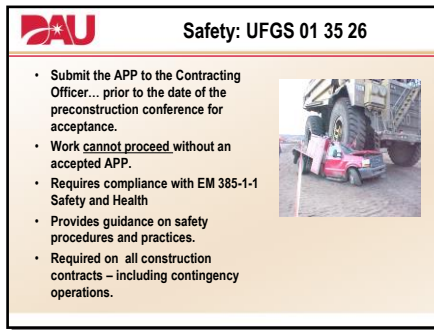
(1) *Provide appropriate safety barricades, signs, and signal lights;*

(2) *Comply with the standards issued by the Secretary of Labor at 29 CFR Part 1926 and 29 CFR Part 1910; and*

(3) *Ensure that any additional measures the Contracting Officer determines to be reasonably necessary for the purposes are taken.*

(c) *If this contract is for construction or dismantling, demolition or removal of improvements with any Department of Defense agency or component, the Contractor shall comply with all pertinent provisions of the latest version of U.S. Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1, in effect on the date of the solicitation.*

(d) *Whenever the Contracting Officer becomes aware of any noncompliance with these requirements or any condition which poses a serious or imminent danger to the health or safety of the public or Government personnel, the Contracting Officer shall notify the Contractor orally, with written confirmation, and request immediate initiation of corrective action. This notice, when delivered to the Contractor or the Contractor's representative at the work site, shall be deemed sufficient notice of the noncompliance and that corrective action is required. After receiving the notice, the Contractor shall immediately take corrective action. If the Contractor fails or refuses to promptly take corrective action, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. The Contractor shall not be entitled to any equitable adjustment of the contract price or extension of the performance schedule on any stop work order issued under this clause.*



(e) The Contractor shall insert this clause, including this paragraph (e), with appropriate changes in the designation of the parties, in subcontracts.

(f) Before commencing the work, the Contractor shall --

(1) Submit a written proposed plan for implementing this clause. The plan shall include an analysis of the significant hazards to life, limb, and property inherent

in contract work performance and a plan for controlling these hazards; and

(2) Meet with representatives of the Contracting Officer to discuss and develop a mutual understanding relative to administration of the overall safety program.

UFGS 01 35 36 GOVERNMENTAL SAFETY REQUIREMENTS

The requirements of this guide specification supplement U.S. Army Corps of Engineers (USACE) Safety and Health Requirements Manual, EM 385-1-1, and clarify safety concerns for high-risk construction activities.

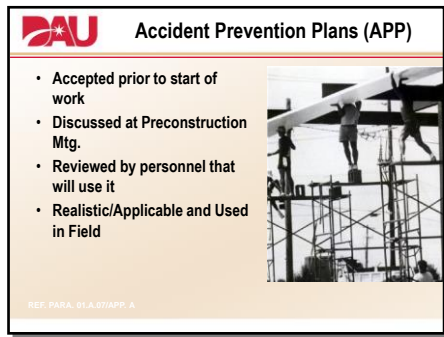


All contracts that include FAR clause 52.236-13 require the Contractor to prepare and execute a written Accident Prevention Plan (APP) in accordance with Appendix A of EM 385-1-1 to include Activity Hazard Analyses (AHAs).

Some contracts, based upon the work to be performed (environmental restoration, asbestos abatement or lead hazard control), require additional special safety and health plans to be made part of and appended to the APP.

Pertinent UFGS contract sections include

- UFGS 01 35 29.13 HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES FOR CONTAMINATED SITES for environmental restoration project;
- UFGS 02 82 14.00 10 ASBESTOS HAZARD CONTROL ACTIVITIES (Army), or 02 82 16.00 20 ENGINEERING CONTROL OF ASBESTOS CONTAINING MATERIALS (Navy), for asbestos abatement; and,
- UFGS 02 83 19.00 10 LEAD BASED PAINT HAZARD ABATEMENT, TARGET HOUSING AND CHILD OCCUPIED FACILITIES (Army), or 02 83 13.00 20 LEAD IN CONSTRUCTION (Navy), for lead hazard control activities.



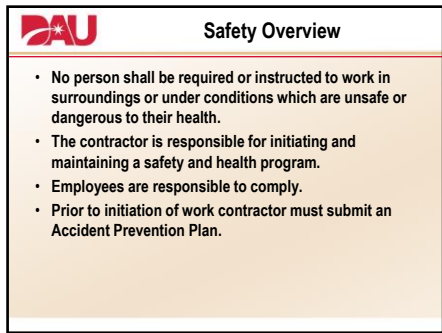
1.6.3.1 Preconstruction Conference

a. Contractor representatives who have a responsibility or significant role in accident prevention on the project shall attend the preconstruction conference.

This includes the project superintendent site safety and health officer, quality control supervisor, or any other assigned safety and health professionals who participated in the development of the APP (including

the Activity Hazard Analyses (AHAs) and special plans, program and procedures associated with it).

b. Discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the conference and an agreement will be reached between the Contractor and the Contracting Officer's representative as to which phases will require an analysis. In addition, establish a schedule for the preparation, submittal, review, and acceptance of AHAs to preclude project delays.⁴

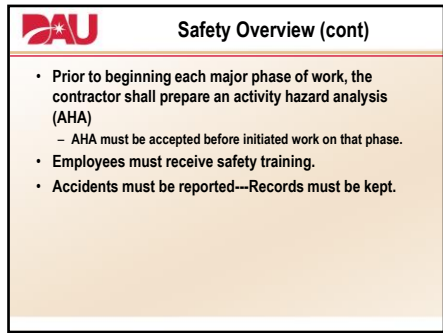


c. Deficiencies in the submitted APP will be brought to the attention of the Contractor at the preconstruction conference, and the Contractor shall revise the plan to correct deficiencies and re-submit it for acceptance. Do not begin work until there is an accepted APP.

Particular activities which require government review are:

- Cranes
- Electrical
- Excavation
- Fall Protection
- Material Handling
- Power Tools
- PPE
- Scaffolds
- Ladders

⁴ <http://www.wbdg.org/ccb/DOD/UFGS/UFGS%2001%2035%2026.pdf>



Safety Manual EM 385-1-1 Highlights

01.A.01 No person shall be required or instructed to work in surroundings or under conditions that are unsafe or dangerous to his or her health.

01.A.02 The employer shall be responsible for initiating and maintaining a safety and health program that complies with the US Army Corps of Engineers (USACE) safety and health requirements.

01.A.03 Each individual employee is responsible for

complying with applicable safety and occupational health requirements, wearing prescribed safety and health equipment, and reporting unsafe conditions/activities, preventing avoidable accidents, and working in a safe manner.

01.A.04 Safety and health programs, documents, signs, and tags shall be communicated to employees in a language that they understand.

1.A.05 Worksites with non-English speaking workers shall have a person(s), fluent in the language(s) spoken and English, on site when work is being performed, to translate as needed.

01.A.12 Inspections - The APP or the USACE Project Safety and Health Plan shall provide for frequent safety inspections, conducted by competent persons, of the work sites, material, and equipment to ensure compliance with the plan and this manual.

01.A.13 Before beginning each work activity involving a type of work presenting hazards not experienced in previous project operations or where a new work crew or sub contractor or subcontractor is to perform the work, the contractor(s) performing that work activity shall prepare an AHA.

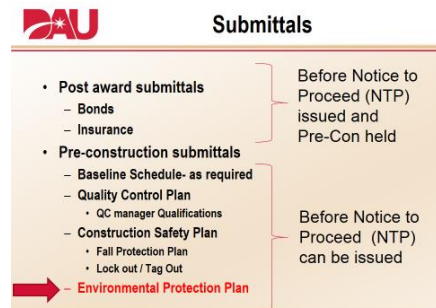
01.A.17 The Contractor shall employ, at the project site, a competent person (for each work shift) to manage the Contractor's APP

Exercise – Safety Plan Review

List the specific safety hazards that should be identified in the accident prevention plan,

<u>Activity</u>	<u>Safety Concerns</u>
<u>Survey the site</u>	
<u>Clear the site</u>	
<u>Level and grade the site</u>	
<u>Form and pour the foundation</u>	
<u>Install the flooring system</u>	
<u>Erect the house frame</u>	
<u>Install the roofing system</u>	
<u>Install exterior siding</u>	
<u>Install the heat pump</u>	
<u>Install the HVAC ductwork</u>	
<u>Install plumbing</u>	
<u>Install electrical wiring</u>	
<u>Install the drywall</u>	
<u>Paint the interior</u>	
<u>Install cabinets</u>	
<u>Install plumbing fixtures</u>	
<u>Install carpet and tile</u>	
<u>Install lighting fixtures</u>	
<u>Install all appliances</u>	
<u>Paint the exterior</u>	
<u>Form and place the driveway</u>	
<u>Landscape the yard</u>	

Submittals- Environmental Protection



Environmental Protection Plan

Typically, the combination of special environmental provisions leads to the contract requiring specific environmental controls. It is not unusual for FAR clauses: 52.223-5 Pollution Prevention; 52.223-9 Recovered Materials; FAR 52.236-7 Permits - (typically wetland or environmental permits); and FAR 52.236-9 protection of vegetation to be included in a

construction contract.

These FAR requirements are detailed further by Uniform Facilities Guide Specification 01 35, 40.00 and / or 01 57 20.00 along with project specific requirements.

UFGS 01 35, 40.00 and 01 57 20.00 identify the requirement to be addressed in an Environmental Protection Plan.

Environmental Plan UFGS 01 57 20.00

- Prior to commencing construction activities or delivery of materials to the site, submit an Environmental Protection Plan for review and approval by the Contracting Officer.
- The purpose of the Environmental Protection Plan is to present a comprehensive overview of known or potential environmental issues which the Contractor must address during construction.
- Additional requirements vary depending on the site and work to be accomplished.

Paragraph 1.7

“Prior to commencing construction activities or delivery of materials to the site, submit an Environmental Protection Plan for review and approval by the Contracting Officer. The purpose of the Environmental Protection Plan is to present a comprehensive overview of known or potential environmental issues which the Contractor must address during construction.”⁵

The plan integrates the DOD Pest Management Program and DoD Environmental Program policies and requirements for construction activities that occur on military Installations

Some of the applicable laws which must be considered are:

- Clean Air Act (CAA),
- Clean Water Act (CWA),
- Coastal Zone Management Act (CZMA),
- Comprehensive Environmental Response,
- Compensation, and Liability Act of 1980 (CERCLA),
- Emergency Planning and Community Right to Know Act(EPCRA),
- Endangered Species Act (ESA),

⁵ <http://www.wbdg.org/ccb/DOD/UFGS/UFGS%2001%2057%2020.00%2010.pdf>

- Fish and Wildlife Coordination Act (FWCA),
- Marine Protection, Research, and Sanctuaries Act (MPRSA),
- National Environmental Policy Act (NEPA),
- National Historic Preservation Act (NHPA),
- National Pollutant Discharge Elimination System (NPDES),
- Oil Pollution Act (OPA),
- Research and Sanctuaries Act, Native American Graves Protection and Repatriation Act (NAGPRA),
- Resource Conservation and Recovery Act (RCRA),
- Rivers and Harbors Act of 1899 (R&H),
- Safe Drinking Water Act (SDWA),
- Toxic Substance Control Act (TSCA),
- Wild & Scenic Rivers Act (WSRA),
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA),
- and Subsequent Executive Orders

Exercise – Environmental Controls

List the environmental hazards which could be encountered on this project.

<u>Activity</u>	<u>Environmental Concerns</u>
<u>Survey the site</u>	
<u>Clear the site</u>	
<u>Level and grade the site</u>	
<u>Form and pour the foundation</u>	
<u>Install the flooring system</u>	
<u>Erect the house frame</u>	
<u>Install the roofing system</u>	
<u>Install exterior siding</u>	
<u>Install the heat pump</u>	
<u>Install the HVAC ductwork</u>	
<u>Install plumbing</u>	
<u>Install electrical wiring</u>	
<u>Install the drywall</u>	
<u>Paint the interior</u>	
<u>Install cabinets</u>	
<u>Install plumbing fixtures</u>	
<u>Install carpet and tile</u>	
<u>Install lighting fixtures</u>	
<u>Install all appliances</u>	
<u>Paint the exterior</u>	
<u>Form and place the driveway</u>	
<u>Landscape the yard</u>	

Partnering



Other ways of ensuring quality construction, prior to work commencement, is a preconstruction conference and, when agreed by both parties, partnering



Partnering

Partnering is a contract management tool technique that is being recognized as an innovative successful approach in Government construction contracts by creating a Government-contractor relationship that promotes achievement of mutually beneficial goals.

What it is NOT:

A contractual agreement

Any legally enforceable right "We" versus "They" mentality

If the Government and the contractor have agreed to incorporate partnering into the contract/project, and formal partnering will be employed, the formal partnering meeting process, as described below, will occur simultaneously with the preconstruction conference prior to performance.

After award the parties meet and each party appoints a leader, who then proceeds with planning a partnering workshop where the parties will draft and agree upon goals and objectives for the project.

A workshop is then held, generally led by an outside expert who is an experienced facilitator. The facilitator assists the parties in developing the charter, goals and objectives.

A joint statement of goals is prepared which serves as the focus of the partnership.

These goals will be revisited at each of the subsequent workshops that may be held throughout the life of the contract.

Partnering is not a contractual issue, but it affects the success of the contract. It is more of an attitude agreement between the Govt and the Ktr. Instead of the historical adversarial relationship, we attempt to overcome this and work as a team to accomplish the project. The Govt doesn't use the contract as a test of the contractor's capability and try to penalize them for all mistakes. And, likewise, the contractor doesn't see the contract as just a money maker venture where they try to squeeze every excess dollar from the Govt.

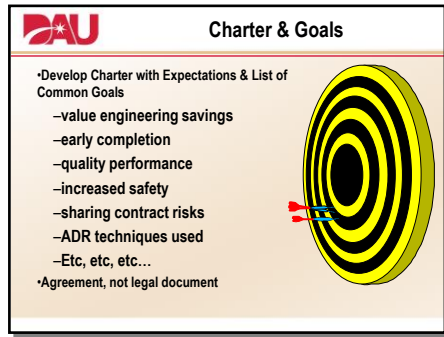
Preparations are important and this starts with a commitment from the top. This is a different approach to administering a contract and some may have a hard time changing after years of dealing with adversarial relationships.

Attendees	
<ul style="list-style-type: none"> • District Engineer • Project Manager • Resident Engineer • Contracting Officer • Customer • Inspectors • A/E Firm • Counsel 	<ul style="list-style-type: none"> ■ Contract Mgr/Owner ■ Project Manager ■ Project Engineer ■ Construction Admin ■ Major Subs ■ Safety Coordinator ■ Quality Control Coordinator

Workshop Attendees

Who should attend? The participants should include all key stakeholders in the contract. For instance:

Government	Contractor
District Engineer Project Manager Resident Engineer Contracting Officer Contracting Specialists Inspectors Counsel Customer Architect-Engineer	Contract Manager Owner Project Manager Project Engineer Executive Officer Construction Administration Safety coordinator Quality Supervisor Major Subcontractors



Broad goals may include:

Meeting the intent of the project design
 Maximizing use of Value Engineering savings
 Limiting cost growth
 Early completion
 /Beneficial Occupancy
 Identifying possible problem areas
 Promoting

safety issues, goals
 Sharing contract risks
 Using the Alternative Disputes Resolution
 Litigation Avoidance

The Workshop

The workshop may turn into a series of workshops, as the parties come together for the purpose of developing the common goals, identifying potential problems and the means by which to handle them

Developing The Charter


The first step in partnering is to develop a charter. The partnering charter is a written statement that is prepared by everyone involved, describing the vision of the relationship. Normally the charter contains a simple opening statement regarding expectations, followed by a list of common goals developed by the group.

All parties are expected to sign the charter. The charter is not a legal document but merely an agreement. Once the charter has been developed and signed, the contracting parties must continue to nurture it throughout performance of the contract.

Summary


Immediately following construction contract award and prior to any work commencing, the Government and contractor review the contract requirements. Construction contracts possess unique FAR and DFARS clauses that govern the project. The Government and Contractor both approach providing a quality construction product, utilizing these clauses.

In the next lesson, further special construction clauses specific to changed conditions will be explored

**In Conclusion...**

What clause protects the government rights to latent defects/fraud after acceptance?

Which Clause gives the Contracting Officer the authority to remove any employee who is unqualified or otherwise objectionable?

**In Conclusion...**

Is a Pre-Con a FAR Requirement?

As A Minimum What Must be Discussed?

A note about homework!

OPTIONAL BAR CHART EXERCISE**Work Breakdown Structure (WBS) Exercise****Task:**

Prepare a WBS for the building of a home on a piece of raw land that you own.

Level 2 of the WBS

Site Work

Exterior Construction

Interior Construction

Finishes

Furniture, Fixtures, and Equipment

Activities (in random order)

Install plumbing	Install the heat pump
Install electrical wiring	Install all appliances
Erect the house frame	Clear the site
Survey the site	Install the HVAC ductwork
Paint the interior	Install the drywall
Install carpet and tile	Install the roofing system
Install cabinets	Install the flooring system
Paint the exterior	Install exterior siding
Form and place the foundation	Form and place the driveway
Level and grade the site	Landscape the yard
Install lighting fixtures	Install plumbing fixtures

Place the activities in order of priority or action.

	1	2	3	4	5
Order	Site Work	Exterior Construction	Interior Construction	Finishes	Furniture, Fixtures, and Equipment
1					
2					
3					
4					
5					
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Bar Chart ExerciseTask:

Create a Bar Chart Schedule for the WBS you prepared in the previous exercise involving the building of a one-story home on a piece of raw land that you own. After you layout your network you will need to prepare a forward and backward pass to determine the critical path(s) through your network.

Activities (in random order)

Install plumbing (3 days)	Install the heat pump (2 days)
Install electrical wiring (5 days)	Install all appliances (2 days)
Erect the house frame (25 days)	Clear the site (1 day)
Survey the site(1day)	Install the HVAC ductwork (4 days)
Paint the interior (5 days + 2 days lag)	Install the drywall (10 days)
Install carpet and tile (2 days)	Install the roofing system (4 days)
Install cabinets (2 days)	Install the flooring system (5 days)
Paint the exterior (1 day + 2 days lag)	Install exterior siding (4 days)
Form and pour the foundation (2 days + 3 days lag)	Form and place the driveway (2 days + 2 days lag)
Level and grade the site (1 day)	Landscape the yard (2 days)
Install lighting fixtures (2 days)	Install plumbing fixtures (2 days)

[illegible]